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## PATENT CLAIMS

- 1. Process for the preparation of bis(perfluoroalkyl)phosphinic acids or salts thereof comprising at least the following process steps:
  - reaction of at least one difluorotris(perfluoroalkyl)phosphorane
     or at least one trifluorobis(perfluoroalkyl)phosphorane with
     hydrogen fluoride in a suitable reaction medium, and
  - b) heating of the reaction mixture obtained in a).
  - Process for the preparation of bis(perfluoroalkyl)phosphinic acids or salts thereof according to Claim 1, characterised in that the salts are prepared by subsequent neutralisation.
    - 3. Process according to Claim 1, characterised in that the difluorotris-(perfluoroalkyl)phosphorane or trifluorobis(perfluoroalkyl)phosphorane employed is a compound of the general formula I

 $(C_nF_{2n+1})_mPF_{5-m}$ 

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in which  $1 \le n \le 8$ , preferably  $1 \le n \le 4$ , and m in each case = 2 or 3.

4. Process according to Claim 1, characterised in that the difluorotris(perfluoroalkyl)phosphorane employed is a compound selected
from the group consisting of difluorotris(pentafluoroethyl)phosphorane, difluorotris(n-nonafluorobutyl)phosphorane and difluorotris(n-heptafluoropropyl)phosphorane.

- Process according to Claim 1, characterised in that the trifluorobis-(perfluoroalkyl)phosphorane compound employed is trifluorobis(nnonafluorobutyl)phosphorane.
- Process according to Claim 1, characterised in that the temperature during the heating in process step b) is from room temperature to 150°C, preferably from 100°C to 145°C, particularly preferably from 135 to 140°C.
- 7. Process according to Claim 1, characterised in that the duration of the heating in process step b) is from 1 to 150 hours, preferably from 10 to 25 hours, particularly preferably from 18 to 22 hours.
- 8. Process according to Claim 1, characterised in that the reaction medium is water or a water-based mixture.
  - 9. Process according to Claim 2, characterised in that bases, preferably hydroxides, oxides, hydrides, amides, carbonates, phosphines or amines, are used to prepare the salts.

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- 10. Salts of bis(perfluoroalkyl)phosphinic acids selected from the group consisting of partially alkylated and peralkylated ammonium, phosphonium, sulfonium, pyridinium, pyridazinium, pyrimidinium, pyrazinium, imidazolium, pyrazolium, thiazolium, oxazolium and triazolium salts salts.
- 11. Salts of bis(perfluoroalkyl)phosphinic acids according to Claim 10, having a cation selected from the group consisting of

where R<sup>1</sup> to R<sup>5</sup> are identical or different, are optionally bonded directly to one another by a single or double bond and are each, individually or together, defined as follows:

- H,

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- halogen, where the halogens are not bonded directly to N,

an alkyl radical (C<sub>1</sub> to C<sub>8</sub>), which may be partially or completely substituted by further groups, preferably  $F, CI, N(C_nF_{(2n+1-x)}H_x)_2, O(C_nF_{(2n+1-x)}H_x), SO_2(C_nF_{(2n+1-x)}H_x), \\ C_nF_{(2n+1-x)}H_x, \text{ where } 1 < n < 6 \text{ and } 0 < x \le 2n+1.$ 

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- Use of the salts of bis(perfluoroalkyl)phosphinic acids according toClaim 10 or 11 as ionic liquids.
- Use of the salts of bis(perfluoroalkyl)phosphinic acids according to
   Claim 10 or 11 as phase-transfer catalyst or surfactants.